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Report of the Director

of the

New Hampshire

Agricultural Experiment Station

Station Bulletin 451

UNIVERSITY OF NEW HAMPSHIRE
DURHAM, NEW HAMPSHIRE

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Report of the Director

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New Hampshire

Agricultural Experiment Station

Station Bulletin 451

UNIVERSITY OF NEW HAMPSHIRE
DURHAM, NEW HAMPSHIRE

Foreword

This bulletin conveys the 69th annual report of the Director of the New Hampshire Agricultural Experiment Station. Listed herein are number, title, and personnel for each of the formal projects active during all or any part of the fiscal year ended June 30, 1957. Also included are a listing of the staff, the titles and authors of publications, a financial statement, and a brief review of services.

Publications of the Station consist of bulletins, reports, reprints of scientific articles in professional journals, mimeographed commentaries, and the Progress Report. A printed list of available publications may be obtained from the Mail Clerk upon request.

Many of our research projects have been supported by grants from industrial organizations. We recognize them as expressions of confidence in the Experiment Station staff. All such gifts have been acknowledged with gratitude. The research program is also augmented by the assignment of five cooperative agents of the United States Department of Agriculture.

Current emphasis in the research program is in four general areas, namely, poultry diseases, breeding improved fruits and vegetables, dairy nutrition, and economic marketing. It has not yet seemed feasible to allocate our limited resources to such currently important areas as new crops and conservation of natural resources. The technological revolution in production has created new problems with respect to the management and reorganization of the farm business. Because of difficulty in employing a man well disciplined in farm management, this area of investigation has been neglected. Current problems of integration also tend to emphasize the importance of farm management research.

United States farmers are the most efficient producers of food and fiber to be found anywhere in the world. Never in history has such a small proportion of our population fed and clothed the people so well, and never could a laborer purchase so much food with so few hours of labor as now in the United States. All this adds up to a tremendous achievement, and is evidence of the large return to society on its investment in agricultural research. It is not likely that we will ever have a perfect plant or animal, or a perfect control of pests. Research can neither decline nor remain static in a flourishing economy.

HAROLD C. GRINNELL
Director

MATHIAS C. RICHARDS
Associate Director

July 1958

Active Research Projects

July 1, 1956 — June 30, 1957

Administration

H-111 General Administration of Federal-Grant Fund Research. H. C. Grinnell, M. C. Richards.

H-112 Planning and Coordination of Cooperative Research. H. C. Grinnell.

H-113 The Planning and Coordination of Research Under Regional Project NE-18, Economics of Forage Production and Utilization. H. C. Grinnell.

H-115 The Planning and Coordination of Research Under Regional Project NE-33, Economics of Irrigation on Northeastern Farms. H. C. Grinnell.

Agricultural and Biological Chemistry

H-42 Soluble Substances in Grass and Legume Silages. T. G. Phillips, Margaret Loughlin.

H-46 Determination of Calcium and Magnesium in Plant Material. Warren Averill. (Project closed 1/15/57.)

H-47 The Hemicellulose of Forage Crops. T. G. Phillips.

H-71 Effect of Soil Type and Mineral Additions on the Mineral Content of Clover and Timothy. G. P. Percival, Dorothy Josselyn.

H-77 Analysis of Forage Samples. G. P. Percival, Dorothy Josselyn.

H-86 Prevention of Discoloration of Pre-Peeled Raw Potatoes. Warren Averill. (Project closed 1/15/57.)

H-124 Influence of the Ration of Laying Hens on the Nutritive Value of the Eggs. A. E. Teeri, Warren Averill.

S-52 The Nutritive Value of Fish and Other Marine Products. A. E. Teeri, Margaret Loughlin, Dorothy Josselyn.

Agricultural Economics

H-59 A Study of the Problems of Obtaining Farming Capital, W. K. Burkett. (Project closed 6/30/57.)

H-80 Costs and Efficiency in Marketing Poultry Products. W. F. Henry.
NEM-11 (Project closed 6/30/57.)

H-95 Alternative Markets and Prices for New Hampshire Milk Produced
NEM-13 in Excess of Fluid Requirements with Particular Reference to the Boston Milkshed. J. R. Bowring.

H-96 The Extent of Migration and Its Effect on Rural Communities in
NE-31 New Hampshire. J. R. Bowring, O. B. Durgin, M. C. Purington.

H-101 Opportunities for the Small Nurseryman in Developing Market
NEM-15 Outlets. L. A. Dougherty.

H-106 Competitive Position of the New England Apple Industry with Particular Reference to New Hampshire. W. H. Drew.

H-109 Economic Effects of Changes in Retail Food Marketing Services.
NEM-17 W. H. Drew.

S-44 Cost Reduction in Dairying. W. F. Henry.

S-61 Evaluation of Methods of Improvement in Decision Making. O. B. Durgin.

S-72 Economic Evaluation of Alternative Production Practices on Specialized Poultry Farms in New Hampshire. W. F. Henry.

Agricultural Engineering

H-107 Agricultural Climatology of New England. J. J. Kolega.
NE-35

H-108 Effect of Tractor Weight on Soil Compaction. G. L. Byers.

S-65 Efficiency of Forage Harvesting. G. L. Byers, J. J. Kolega.

S-66 Developing Labor Saving Equipment for Agriculture. P. A. Gilman, J. J. Kolega.

Agronomy

H-32 The Adaptation of New Potato Varieties. P. T. Blood.

H-33 Variety Trials of Grain Crops for Forage and Grain Yields. L. J. Higgins.

H-69 The Influence of Fertilization and Stage of Cutting on the Yield, Persistency, and Protein Content of Bromegrass (Bromus inermis). N. K. Peterson, P. T. Blood, V. T. Valassis.

H-83 The Influence of Deep Tillage and Fertilizer Placement on Soil
NE-11 Structure and Crop Production on Soils with Compact Subsoils. S. A. Miller, N. K. Peterson.

H-93 Evaluation of Soil Physical Conditions that are Favorable to the
NE-11 Yield of Crops. S. A. Miller.

H-94 The Adaption and Productivity of Regionally Developed Selections
NE-28 and Strains of Smooth Bromegrass as Related to Morphologic and Physiologic Characteristics. G. M. Dunn, S. A. Tamimi.

H-99 Water and Fertilizer Requirements of Selected Crops and Soils
NE-22 as Related to Supplemental Irrigation. A. B. Prince, P. T. Blood, G. M. Dunn.

H-105 The Improvement of White Clover. G. M. Dunn and R. A. Kilpatrick, USDA Cooperator.

H-116 Improvement of Smooth Bromegrass, Red Clover and Alfalfa. G. M. Dunn, L. J. Higgins, S. A. Tamimi.

S-43 A Survey of the Soils of New Hampshire. W. H. Lyford, USDA Cooperator.

S-54 Soil Fertility Studies of Forage Crops. A. B. Prince.

S-59 An Economic Evaluation of Forage Production and Utilization With Emphasis on Pastures. F. S. Prince.

Bacteriology

H-49 Studies on Bovine Mastitis. L. W. Slanetz, F. E. Allen. (Project Closed 1/31/57.)

H-62 Investigations on the Microorganisms of the Bovine Rumen. W. A. Ayers.

H-120 Diagnosis and Control of Bovine Mastitis. L. W. Slanetz, F. E. Allen, G. J. Maraglia.

Botany

H-34 Testing Tomato Varieties for Resistance to Late Blight Pathogen. A. E. Rich. (Project closed 1/31/57.)

H-44 Propagation of Woody Plants. Stuart Dunn, S. C. Datta.

H-57 Fungicide Investigations. A. E. Rich, J. G. Barrat, A. D. Partridge, C. S. Campbell.

H-63 Virus Diseases of Strawberries in New Hampshire. A. E. Rich, J. G. Barrat.

H-68 The Effects on Vegetation of Weed-control Measures Applied to Woody Plant Areas. A. R. Hodgdon.

H-90 NE-12 Light and Temperature Effects on Phytotoxity with Respect to Herbicides. Stuart Dunn, B. H. Kwack.

H-91 Effects of Light Quality on Plant Growth. Stuart Dunn, S. C. Datta.

H-103 Anatomy and Morphology of the Vegetative Organs of Representative Rubus Species. C. G. Nast, S. K. Majumder.

H-121 Testing Tomato Varieties and Selections for Resistance to the Early Blight *(Alternaria solani)* and Late Blight *(Phytophthora infestans)* Pathogenes. A. E. Rich.

S-30 The Flora of New Hampshire. A. R. Hodgdon.

S-46 Plant Disease Investigations. A. E. Rich.

Dairy Husbandry

H-65 The Influence of Herd Management Practices on Milk Production, Efficiency of Reproduction, and Herd Replacement Maintenance. K. S. Morrow. (Project closed 2/28/57; continued as S-67.)

H-67 The Relation of Seminal Fluid Fructose Levels to Factors Affecting Breeding Efficiency. C. H. Boynton.

H-75 Maximum Use of Roughage in Feeding Dairy Cattle. H. A. Keener, Burr Clark Jr., A. C. Paul. (Project closed 6/30/57.)

H-76 NE-1 The Effect of the Maximum Use of Roughage upon the Reproductive Efficiency of Dairy Cattle. H. A. Keener, A. C. Paul, J. E. Vanderveen.

H-85 Package Milk Vending Machines as a Means of Increasing Fluid Milk Sales. H. C. Moore.

H-102 NE-24 The Nutritive Evaluation of Forages for Dairy Cattle. N. F. Colovos, H. A. Keener, A. C. Paul, A. E. Teeri, H. A. Davis, Dorothy Josselyn, P. T. Blood.

S-60 The Use of Citrus Pulp to Reduce Cost of Concentrates in Feeding Dairy Cattle. H. A. Keener.

S-67 The Influence of Herd Management Practices on Milk Production, Efficiency of Reproduction and Herd Replacement Maintenance. K. S. Morrow.

Entomology

H-43 Factors Affecting the Action of Acaricides. R. L. Blickle, W. J. Morse.

H-58 Testing New Organic Insecticides Under New Hampshire Conditions. J. G. Conklin, R. L. Blickle, W. J. Morse.

H-114 Relation of Honeybees to Horticultural Crops in New Hampshire. W. R. Lee.

H-122 Testing New Organic Pesticides Under New Hampshire Conditions. J. G. Conklin, R. L. Blickle, W. J. Morse.

S-34 Insect Record. J. G. Conklin, W. J. Morse.

S-35 Control of Apple Maggot and Certain Other Economic Insects. J. G. Conklin.

S-36 Studies on the Ecology of European Spruce Saw-Fly. J. G. Conklin.

S-68 A Preliminary Investigation of Forage Insects in New Hampshire. W. R. Lee.

Forestry

H-70 The Relationship of the Growth of White Pine in New Hampshire to Selected Environmental Characteristics. Bertram Husch, E. Woodward.

H-82 NEM-6 Marketing Forest Products in New Hampshire. L. C. Swain, O. P. Wallace.

H-89 The Utilization of Products from Chemically Treated Trees. L. C. Swain, E. Woodward.

H-104 Site Preparation for Reproduction of Eastern White Pine. H. W. Hocker.

H-110 Stimulation of Seed Production of White Pine (Pinus strobus L.). H. W. Hocker, E. Woodward.

S-1 Reproduction Studies. H. W. Hocker, C. L. Stevens.

S-51 Relation of Available Labor to Woodlot Income on New Hampshire Dairy Farms. O. P. Wallace, R. W. Becking.

S-70 Marketing Eastern White Pine Lumber from Maine and New Hampshire Sawmills. O. P. Wallace.

Home Economics

H-97 Color Changes in White Dacron Blouses. J. R. Ericson.

H-117 NE-37 The Effect of Isocaloric Exchanges Between Protein and Fat on the Metabolic Interplay of Specific Blood Nutrients. A. L. Smith, S. R. Shimer, W. Averill, C. H. Howarth.

S-64 The Evaluation of New Varieties and Strains of Fruits and Vegetables and their Suitability for Processing. A. M. Light. (Project closed 5/31/57.)

Horticulture

H-37 Variety Tests of Fruits and Vegetables. A. F. Yeager, A. M. Light, Russell Eggert.

H-38 Improvement of Ornamental Plants. E. B. Risley, E. M. Meader, V. Wiegand.

H-39 Cultural Studies with Horticultural Crops. Russell Eggert, J. T. Kitchin.

H-40 Temperature Relations in Horticultural Plants Under New Hampshire Conditions. Russell Eggert, L. P. Latimer.

H-41 Nutritional Studies with Horticultural Plants. L. P. Latimer, G. P. Percival, Dorothy Josselyn.

H-54 Breeding Better Vegetables for New Hampshire. E. M. Meader, A. F. Yeager, Shi-an-Yu, Warren Averill.

H-56 The Development, Improvement, and Maintenance of Blueberry Fields. W. W. Smith.

H-64 The Use of Rootstocks and Interstocks as a Means of Securing Smaller, Hardier, and More Productive Apple Trees. W. W. Smith, Russell Eggert.

H-74 Breeding Improved Fruits for New Hampshire. A. F. Yeager, E. M. Meader, Shi-an-Yu.

H-87 NE-9 The Testing and Utilization of New Plant Materials in New Hampshire. A. F. Yeager.

S-38 Nut Improvement. E. M. Meader, V. Wiegand.

S-69 The Effect of Rootstocks and of Pre-Planting Soil Treatments on the Up-Take of Nutrients by Apple Trees. Russell Eggert.

Poultry Husbandry

H-52 The Inheritance of Feed Utilization Efficiency in Poultry. W. M. Collins, Samuel Moyer.

H-53 Breeding for Meat-Type in Chickens. W. M. Collins, W. C. Skoglund.

H-55 Efficiency of Feed Utilization in Poultry Production. R. C. Ringrose, R. M. Vondell.

H-73 A Study of Methods in the Development and Management of Pastures for Growing Pullets. R. C. Ringrose.

H-78 NE-5 The Isolation and Control of Chronic Respiratory Disease in Chickens and the Relationship to the Satisfactory Immunization with Newcastle Disease and Infectious Bronchitis Vaccines. W. R. Dunlop, R. G. Strout, T. Tzianabos, R. M. Vondell.

H-81 Factors Influencing the Market Quality of Eggs on New Hampshire Farms. W. C. Skoglund.

H-88 NE-8 Influence of Light and Humidity Upon the Physical Condition of Broilers. W. C. Skoglund.

H-92 NE-6 Recurrent Selection vs. Closed Flock Selection for Improving Broiler Qualities. W. M. Collins.

H-118 Control of Poultry Pathogens. W. R. Dunlop, R. G. Strout, T. Tzianabos, S. C. Thayer.

H-123 Basic Problems in Random Sample Testing of Broiler Strains of Chickens. W. M. Collins.

H-125 The Inheritance of Feed Utilization Efficiency in Poultry. W. M. Collins, S. E. Moyer.

S-55 Factors Influencing Sexual Maturity of Pullets. R. C. Ringrose.

S-56 The Effect of Low Level Chermotherapeutic Drugs in the Control of Coccidiosis in Growing Birds and Their Subsequent Performance in the Laying House. W. R. Dunlop. (Project closed May 1, 1957.)

S-62 A Study of the Complication of Pleuropneumonialike Organisms when Newcastle Disease and Infectious Bronchitis Vaccinations (Dust) Are Carried Out. W. R. Dunlop. (Project closed May 23, 1957.)

S-71 Control of Avian Coccidiosis. R. G. Strout, W. R. Dunlop, W. C. Skoglund.

State Services

Inspection of Fertilizers and Feedingstuffs

The laboratory has analyzed the official samples of commercial fertilizers and fertilizer materials as submitted by the State Department of Agriculture. Of the 174 samples submitted, 108 met the guarantee in all respects. In addition to the usual nitrogen, phosphoric acid, and potash analyses, magnesium and boron were determined in samples of brands carrying guarantees for these elements.

In general the manufacturers continue to supply a good product to our farmers. Detailed results of the analyses of these samples are published in Bulletin 432 of this Station.

In this fiscal year the Control Supervisor submitted 702 official samples of feedingstuffs. Of these, 63 samples represented cat and/or dog foods. Deficiencies were in general small and on the over-all basis, 8.4 percent were deficient in protein, 4.9 percent were deficient in fat, and 3.7 percent contained excess crude fiber. Percentagewise the cat and dog foods varied more from the guarantee than the other type of feeds. These feeds are improving in this respect as time goes on. Sixty-seven samples represented bulk deliveries of feeds and 61 of them were drawn at the farm. Since more and more feed, as well as fertilizer, is being delivered directly from the point of manufacture to the farm, the inspectors are drawing more samples at the farm.

Constant check is maintained on the analytical methods used in the laboratory. Two check sample programs are participated in by this laboratory. Over 100 laboratories throughout the country take part in these programs. The laboratory is also asked by manufacturers to supply a part of our sample for checking purposes in many cases when we report a deficiency. In order to continue a good standing, it is necessary that the procedures of analysis be continually checked.

A total of 32 samples of miscellaneous materials, such as hay, silages, etc., were examined for residents of the state.

H. A. Davis

Soil Testing

During the last fiscal year residents of the state have submitted 4,190 soil samples for analysis of pH and available nutrients. This work entailed 29,330 determinations. Two hundred twenty-five samples from greenhouses were tested for soluble salts. Five peat and muck samples submitted for identification were analyzed for moisture content, organic matter content, and for pH value, and suggestions were made as to their commercial value.

Seventeen samples were submitted by veterinarians to be tested for specific poisons.

G. P. Percival

Seed Inspection

Seed inspection work for the New Hampshire State Department of Agriculture was conducted during the past year. The results of the tests of 680 official samples collected by the State Seed Inspectors throughout the state are reported in Station Bulletin 445. In addition, 1,173 private samples were sent in by seed dealers and farmers, making a total of 1,853 samples handled at the laboratory.

The laboratory took part in the referee testing of samples sent out to all official seed testing laboratories in United States and Canada.

Bessie G. Sanborn

Diagnostic Service Performed at the Poultry Labrotary

From July 1, 1956, to June 30, 1957, a total of 5,966 specimens of all kinds were submitted to the Poultry Laboratory for diagnosis. These represented 2,286 cases.

A total of 4,492 chicken specimens were examined, and 110 turkeys and 15 miscellaneous birds. Forty-eight cases consisting of 65 specimens from various animals were also handled by the laboratory personnel. There were 199 cases (834 samples) of blood samples submitted for immunity tests.

A. C. Corbett
Richard Strout
W. R. Dunlop
F. E. Allen

Infectious Bronchitis Virus

The Poultry Laboratory has continued to grow infectious bronchitis virus on embryonating eggs, and after being tested for purity and potency it is sold to poultrymen of the state for inoculation of their susceptible birds. During the fiscal year, 150 lots of this virus were supplied to New Hampshire poultrymen.

A. C. Corbett
F. E. Allen
W. R. Dunlop

Pullorum Testing

Testing of poultry for pullorum disease in the state is done by the Poultry Laboratory at the University. During the fiscal year, 1,261,574 birds were tested by means of the tube agglutination test.

In addition, 21,650 samples were re-tested, thus giving a total of 1,283,224 samples tested for the year.

Of 336 flocks tested, one was found to harbor infection. Thus .0035 percent of the birds under test was infected.

A. C. Corbett
F. E. Allen
W. R. Dunlop

New Hampshire Agricultural Experiment Station Staff

June 30, 1957

Administration

Harold C. Grinnell, ph.d., Director
Mathias C. Richards, ph.d., Associate Director
Ford S. Prince, b.s., Administrative Assistant
Russell C. Smith, b.a., Purchasing Assistant
Norman W. Myers, b.a., Treasurer
W. Kent Martling, l.l.b., Assistant Treasurer
L. Franklin Heald, b.a., Editor
Henry W. Corrow, Jr., b.s., Associate Editor for Agriculture and Home Economics
Thelma Brackett, a.b., Librarian
William E. McGrath, a.m.l.s., Librarian, Plant and Animal Sciences Library

Agricultural and Biological Chemistry

Arthur E. Teeri, ph.d., Chemist
Thomas G. Phillips, ph.d., Chemist
Stanley R. Shimer, m.s., Associate Chemist
Gordon P. Percival, m.s., Associate Chemist
Henry A. Davis, m.s., Associate Chemist
Margaret E. Loughlin, m.s., Assistant Chemist
Dorothy Josselyn, Senior Laboratory Technician
Marcia C. McCann, Laboratory Technician

Agricultural Economics

William F. Henry, m.s., Economist
James R. Bowring, ph.d., Associate Economist
William H. Drew, m.s., Associate Economist
Lawrence A. Dougherty, b.s., Assistant Economist
Owen Durgin, m.a., Sociologist
George E. Frick, m.s., Economist, a.r.s.,u.s.d.a.
George B. Rogers, m.s., Economist, a.m.s.,u.s.d.a.
Edwin T. Bardwell, b.s., Economist, a.m.s.,u.s.d.a.

Agricultural Engineering

John J. Kolega, m.s., Agricultural Engineer
Gordon L. Byers, m.s., Associate Agricultural Engineer
Paul A. Gilman, m.s., Assistant Agricultural Engineer
Robert S. Palmer, m.s., Agricultural Engineer, u.s.d.a. Cooperator

Agronomy

Allan B. Prince, ph.d., Associate Soil Chemist
Ford S. Prince, b.s., Agronomist
Leroy J. Higgins. b.s., Associate Agronomist
Paul T. Blood, m.s., Associate Agronomist
Gerald M. Dunn, ph.d., Associate Plant Breeder
Nobel K. Peterson, ph.d., Associate Agronomist
Walter Lyford, m.s., s.c.s. Cooperator
Pauline C. Lavoie, b.s., Research Assistant
Bessie Sanborn, Seed Analyst
Sadi A. Tamimi, b.s., Graduate Research Assistant

Bacteriology

Lawrence W. Slanetz, ph.d., Bacteriologist
William A. Ayers, ph.d., Assistant Bacteriologist
Fred E. Allen, d.v.m., Veterinarian
Clara H. Bartley, ph.d., Research Associate
Alberta F. Menter, Laboratory Assistant
Maurice E. Goulet, b.s., Graduate Research Assistant
Gennaro G. Miraglia, b.s., Graduate Research Assistant
Joseph Marelli, Departmental Technician

Botany

Albion R. Hodgdon, ph.d., Plant Taxonomist
Stuart Dunn, ph.d., Plant Physiologist
Charlotte G. Nast, ph.d., Associate Cytologist
Avery E. Rich, ph.d., Plant Pathologist
R. A. Kilpatrick, ph.d., a.r.s. Cooperator
Joseph G. Barrat, Jr., m.s., Graduate Research Assistant
Subhash C. Datta, m.s., Graduate Research Assistant
Sanat K. Majumder, m.s., Graduate Research Assistant
Arthur D. Partridge, b.s., Graduate Research Assistant
Carl S. Campbell, b.s., Graduate Research Assistant
Beyoung H. Kwack, m.s., Graduate Research Assistant

Dairy Husbandry

Kenneth S. Morrow, m.s., Dairy Husbandman
Harry A. Keener, ph.d., Dairy Husbandman
Herbert C. Moore, m.s., Associate Dairy Husbandman
Nicholas F. Colovos, m.s., Associate Animal Nutritionist
C. Hilton Boynton, m.s., Associate Dairy Husbandman
Ann C. Paul, b.s., Research Assistant
Burr Clark, Jr., b.s., Graduate Research Assistant
William W. Feaster, b.s., Graduate Research Assistant
John E. Vanderveen, b.s., Graduate Research Assistant

Entomology

James G. Conklin, ph.d., Entomologist
Robert L. Blickle, ph.d., Associate Entomologist
William R. Lee, Jr., ph.d., Assistant Entomologist
Wallace J. Morse, b.s., Research Assistant in Entomology

Forestry

Clark L. Stevens, ph.d., Forester
Lewis C. Swain, m.f., Associate Forester
Bertram Husch, ph.d., Associate Forester
Oliver Wallace, ph.d., Assistant Forester
Harold W. Hocker, Jr., d.for., Assistant Forester
Edwin C. Woodward, b.s., Graduate Research Assistant

Home Economics

Anna Light Smith, ph.d., Home Economist
R. June Ericson, m.a., Associate Home Economist

Horticulture

Albert F. Yeager, ph.d., Horticulturist
L. Phelps Latimer, ph.d., Associate Horticulturist
Elwyn M. Meader, m.s., Associate Horticulturist

William W. Smith, ph.d., Associate Horticulturist
Russell Eggert, m.s., Associate Horticulturist
J. T. Kitchin, ph.d., Associate Horticulturist
Edward B. Risley, m.s., Assistant Horticulturist
Radcliffe Pike, m.s. Collaborator
Virginia Wiegand, b.s., Graduate Research Assistant
Shin-an-Yu, b.s., Graduate Research Assistant

Poultry Husbandry

Winthrop C. Skoglund, m.s., Poultry Husbandman
Richard C. Ringrose, ph.d., Poultry Nutritionist
Fred E. Allen, d.v.m., Veterinarian
Alan C. Corbett. d.v.m., Pathologist
William R. Dunlop, d.v.m., Research Pathologist
Walter M. Collins, m.s., Poultry Geneticist
Richard G. Strout, m.s., Assistant Poultry Husbandman
Wallis S. Rand, Laboratory Technician
Theodore Tzianabos, b.a., Senior Laboratory Technician and Research Assistant
Emily Donovan, Junior Laboratory Technician
Harriet N. Fogg, Junior Laboratory Technician
Bertha Mann, Junior Laboratory Technician
Katheryn Moore, Junior Laboratory Technician
Rose Thomas, Junior Laboratory Technician
Edna Woodward, Junior Laboratory Technician
Grace Sullivan, Junior Laboratory Technician
Stephan Thayer, b.s., Graduate Research Assistant
Richard M. Vondell, m.s., Research Associate
Samuel Moyer, b.s., Graduate Research Assistant
Carl Weston, m.s., Graduate Research Assistant
Jere R. Beckman, b.s., Graduate Research Assistant

Changes in Personnel

Additions to Staff

Benjamin, Jeanne, Research Assistant in Agricultural and Biological Chemistry (September 1, 1956-February 12, 1957)
Bartley, Clara H., Research Associate in Bacteriology (September 1, 1956-)
Becking, Rudy W., Assistant Forester (September 1, 1956-June 1, 1957)
Beckman, Jere R., Graduate Research Assistant in Poultry Husbandry (February 1, 1957-)
Campbell, Carl S., Graduate Research Assistant in Botany (July 1, 1956-June 30, 1957)
Clark, Burr, Jr., Graduate Research Assistant in Dairy Husbandry (September 1, 1956-)
Feaster, William H., Graduate Research Assistant in Dairy Husbandry (July 1, 1956-)
Goulet, Maurice E., Graduate Research Assistant in Bacteriology (September 1, 1956-June 30, 1957)
Kitchin, John T., Associate Horticulturist (July 1, 1956-)
Koleca, John J., Agricultural Engineer (February 1, 1957-)
Kwack, Beyoung Hwa, Graduate Research Assistant in Botany (February 1, 1957-)
Lavoie, Pauline C., Research Assistant in Agronomy (July 1, 1956-)
Lee, William R., Jr., Assistant Entomologist (July 1, 1956-)
Mann, Bertha, Junior Laboratory Technician, (October 15, 1956-)
McCann, Marcia L., Laboratory Technician (October 1, 1956-)
McGrath, William E., Librarian, Plant and Animal Sciences Library (July 9, 1956-)
Moyer, Samuel E., Graduate Research Assistant in Poultry Husbandry (July 1, 1956-)

Peterson, Nobel K., Associate Agronomist, (February 1, 1957-)
Sullivan, Grace, Junior Laboratory Technician in Poultry Husbandry July 1, 1956-)
Thayer, Stephen C., Graduate Research Assistant in Poultry Husbandry (July 1, 1956-)
Valassis, Vlassios T., Assistant Agronomist (September 1, 1956-January 31, 1957)
Vanderveen, John E., Graduate Research Assistant in Dairy Husbandry (July 1, 1956-)
Vondell, Richard, Research Associate in Poultry Husbandry (August 1, 1956-June 30, 1957)
Wiegand, Virginia, Graduate Research Assistant in Horticulture (September 1, 1956-)
Woodward, Edwin C., Graduate Research Assistant in Forestry (September 1, 1956-)

Losses from Staff

Averill, Warren, Assistant Chemist (September 1, 1951-January 15, 1957)
Becking, Rudy W., Assistant Forester (September 1, 1956-June 1, 1957)
Benjamin, Jeanne, Research Assistant in Agricultural and Biological Chemistry (September 1, 1956-February 12, 1957)
Burkett, W. Keith, Associate Economist (April 1, 1948-February 4, 1957)
Campbell, Carl S., Graduate Research Assistant in Botany (July 1, 1956-June 30, 1957)
Datta, Subhash C., Graduate Research Assistant in Botany (September 7, 1954-June 30, 1957)
Ericson, R. June, Associate Home Economist (September 1, 1952-June 30, 1957)
Goulet, Maurice, Graduate Research Assistant in Bacteriology (September 1, 1956-June 30, 1957)
Mann, Bertha, Junior Laboratory Technician in Poultry Husbandry (July 1, 1955-July 1, 1956)
Miller, Scott A., Assistant Agronomist (July 1, 1953-June 4, 1957)
Miraglia, Gennaro J., Graduate Research Assistant in Bacteriology (July 1, 1956-June 30, 1957)
Palmer, Robert S., Assistant Agricultural Engineer (July 1, 1953-January 31, 1957)
Partridge, Arthur, Graduate Research Assistant in Botany (July 1, 1954-June 30, 1957)
Phillips, Thomas G., Chemist (1925-Retired June 30, 1957)
Prince, Ford S., Agronomist, (1925-Retired June 30, 1957)
Stabb, Vesta F., Research Assistant in Agricultural and Biological Chemistry (August 18, 1952-August 10, 1956)
Valassis, Vlassios T., Assistant Agronomist (September 1, 1956-January 31, 1957)
Vondell, Richard, Research Associate in Poultry Husbandry (August 1, 1956-June 30, 1957)
Weston, Carl, Graduate Research Assistant in Poultry Husbandry (February 1, 1956-June 30, 1957)

Publications

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406 *Effect of Frequency of Picking Cucumbers on Income.* H. C. Woodworth.
425 *The Population of New Hampshire, Part 2,—Migration and Changes in Composition.* J. R. Bowring, M. S. Purington, and O. B. Durgin.
426 *Distributing and Handling Grain-Feeds in New Hampshire, Part 1—Characteristics of Milling and Distributing Firms.* G. R. Rogers and H. C. Woodworth.
427 *Distributing and Handling Grain-Feeds in New Hampshire, Part 2—Problems in Retail Distribution.* G. R. Rogers and H. C. Woodworth.
428 *Inspection of Commercial Feedingstuffs.* H. A. Davis and V. F. Staab.
429 *Report of the Director (June 1956).*
430 *Production Efficiency on New England Dairy Farms, Part V—Adjustments in Obtaining Dairy Herd Replacements.* G. E. Frick and W. F. Henry.

431 *Distributing and Handling Grain-Feeds in New Hampshire. Part 3—Improving the Efficiency of the Grain-Feeding Operation on Poultry and Dairy Farms.* G. R. Rogers and H. C. Woodworth.
432 *Inspection of Commercial Fertilizers.* H. A. Davis and V. F. Staab.
433 *Buying Practices of Wood-Using Industries in New Hampshire.* L. C. Swain and O. P. Wallace.
434 *Results of Seed Tests for 1956.* Bessie G. Sanborn.
435 *The Influence of Waste Bark on Plant Growth.* Stuart Dunn.
436 *Competition for New England Apples on United States Markets, 1. Market Prospects for Growers.* Joseph Gartner and J. R. Bowring.
437 *The Population of New Hampshire, Part 3—Effects of Migration on the Small New Hampshire Town.* O. B. Durgin.
438 *The Nutritive Value of Dried Citrus Pulp for Dairy Cattle.* H. A. Keener, N. F. Colovos and R. B. Eckberg.
439 *Forage Variety Trials in New Hampshire 1951-1956*—G. M. Dunn and P. T. Blood.
440 *Breeding New Vegetable Varieties.* A. F. Yeager and E. M. Meader.
441 *Production and Utilization of Milk By-Products in New Hampshire.* J. R. Bowring.
442 *Report of the Director (June 1957)*

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95 *White Pine Growth and Soil Relationship in Southeastern New Hampshire.* Bertram Husch and W. H. Lyford.

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163 Yeager, A. F., E. M. Meader, "A Flesh Color Chimera in the Peach." *Jour. Heredity*, 47:77-78, 1956.
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Research Mimeographs

Agricultural Economics

14 Dougherty, L. A. "Packing and Shipping New Hampshire Hardy Chrysanthemum Rooted Cuttings. Methods of Packing, Condition of Plants at Destination, Shipping Costs and Charges."

15 Dougherty, L. A. "Highway Traffic Counts May Serve as a Business Aid to Those Planning Sales of Nursery Plants."

Botany

4 Dunn, Stuart and A. B. Datta, "The Action of 2,4-D on Mustard as Modified by Six Different Light Qualities."

Expenditures for the Fiscal Year Ending June 30, 1957

	Hatch	9b3	Supplementing
Personal Services	$180,320.92	$ 25,523.49	$124,984.28
Travel	2,028.84	4,559.54	5,619.46
Transportation of Things	295.56	138.45	354.82
Communication Service	21.70	148.32	1,464.13
Rents and Utility Services	293.00	5.00	460.11
Printing and Reproduction	937.75	117.45	1,035.80
Other Contractual Services	325.85	161.40	117.05
Supplies and Materials	21,172.95	12,357.80	35,339.43
Equipment	14,238.78	4,973.55	11,385.81
Lands and Structures	1,053.65		25,613.00
	$220,689.00	$ 47,985.00	$206,373.89

Income from Supplementing Expenditures	
State Money Offsetting Federal Funds	$130,689.00
State Money for Station	25,613.00
Research Sales	17,643.11
Other Income (Mostly Private Grants)	32,428.78
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